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Social environments and physical aggression among 21,107 students in the United States and Canada

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Abstract

Background—Physical aggression is an important issue in North American populations. The importance of student social environments in the occurrence of physical aggression requires focused study. In this study, reports of physical aggression were examined in relation to social environment factors among national samples of students from Canada and the United States.

Methods—Students in grades 6–10 from the US (n=14,049) and Canada (n=7,058) who had participated in the *Health Behaviour in School-aged Children Survey* were studied. Rates of student physical aggression were compared between the two countries. School, family, socioeconomic, and peer-related factors were considered as potential risk factors. A simple social environment risk score was developed using the US data and was subsequently tested in the Canadian sample.

Results—Risks for physical aggression were consistently higher among US vs. Canadian students, but the magnitude of these differences was modest. The relative odds of physical aggression increased with reported environmental risk. To illustrate, US boys in grades 6 to 8 reporting the highest social-environment risk score (5+) experienced a relative odds of physical aggression 4.02 (95% CI 2.7–5.9) times higher than those reporting the lowest score (adjusted OR for risk scores 0 through 5+: 1.00, 1.19, 2.10, 2.01, 3.71, 4.02; $p_{\text{trend}} < 0.001$).

Conclusions—Unexpectedly, rates of physical aggression and associations between social environments and student aggression were remarkably similar in Canada and the United States. Family, peer, and school social environments serve as risk or protective factors, with significant cumulative impact on physical aggression in both countries. Given the observed high rates and the many negative effects of aggression on long-term health, school policies aimed at the reduction of such behavior remain a clear priority.

Keywords

adolescents; aggression; fighting; social environments; violence

INTRODUCTION

Once seen as the exclusive purview of the criminal and juvenile justice systems, aggression is now recognized as a public health problem.¹ There is no single problem that is more prevalent and perhaps more vexing to adolescents, parents, and school officials.^{2,3} Among adolescents, aggression typically manifests itself in the form of physical fighting and physical bullying.^{4–6} Involvement in aggression is associated in turn with injury and negative social consequences.^{1,7}

Physical aggression has been studied in past epidemiological analyses.⁸ In one cross-national survey, rates of engaging in at least one fight in the previous 12 months among 11–15 year olds ranged from 37% in Finland to over 60% in Scotland, Israel, Hungary and other East European countries; rates in Canada and the US were 48%.⁹ Rates of aggression are generally higher among males and minority populations.^{1,10,11} In regional and national surveys of adolescents in middle and high schools, 20–36% of US adolescents reported being in a physical fight in the past 12 months, with higher national rates observed among males (43%), Black (43%) and Hispanic (41%) populations, and older grades (e.g., 44% vs. 29% in grades 12 and grade 9, respectively).^{1,5,6,12} Most physical fights do not require medical attention,^{12,13} however, physical fighting is associated with an increased likelihood of future injury,⁹ mental health problems,⁷ substance use,^{1,14} school adjustment problems,^{1,15} and violent crime.¹⁶

Within the behavioral sciences, persistent aggressive behavior among adolescents has been considered from the perspectives of temperament, development, and environment.^{17,18} Clearly, some youth are both aggressive and poorly socialized.¹ Although these youth represent a small proportion of the population, their “early onset” behaviors account for a disproportionate amount of aggression and violence.^{1,4} Most aggressive behavior is episodic and transient and associated with the interaction between adolescent development and environmental factors.¹ Self-control develops gradually during adolescence¹⁹ and, in the absence of the socializing influence of attentive adults, minor interpersonal conflicts can escalate into physical violence. Variability in size and maturity of adolescents contributes to aggressive behavior²⁰ along with established risk factors: socio-economic status; antisocial attitudes and behavior; harsh, abusive, or lax parenting; poor adjustment to school; and affiliation with anti-social peers.^{1,16,21} At a community level, exposure to violence, crime, and drugs in neighborhoods and schools are potential determinants.²² Conversely, school and community connectedness, authoritative parenting, and positive relationships with pro-social peers are considered to be protective factors.^{1,16,22,23}

The United States and Canada are two countries with many shared values. However, there are important differences between these countries in terms of the prevalence of juvenile and adult violent crime. Violent crime and juvenile incarceration rates are both markedly higher in the United States.²⁴ One important step in understanding these observed differences is to examine potential causes of physical aggression which may be precursors to more serious forms of violence. Factors characterizing social environments are of particular interest because they are broad indicators, reflect policy, and may be amenable to change.

Adolescent health and risk behaviors are affected by social influences in the home, peer-group, and school, as well as family socio-economic status,²³ and risks associated with these social-environmental contexts are potentially cumulative.²⁵ Risk factors for aggressive behavior may represent a single pattern or it is possible that these risk factors are independent and have a cumulative effect.^{26,27} A coherent pattern or syndrome would suggest that interventions need to simultaneously address a complex array of risk factors.

Study Aim

Physical aggression and social-environmental factors potentially associated with its occurrence were studied among samples of students from the United States and Canada. School, family, socioeconomic, and peer-related factors were considered as potential risk factors. A simple social environment risk score was developed using the US data and was subsequently tested in the Canadian sample. Cross-country differences and similarities were identified to evaluate the consistency of observed associations, with the ultimate goals of evaluating the protective effects of social relationships and informing prevention efforts for physical aggression at the school and societal levels in both countries.

METHODS

Health Behaviour in School-Aged Children

Analyses were conducted with data from the Health Behaviour in School-Aged Children Survey (HBSC), a cross-national survey of adolescent health behavior conducted every four years under the auspices of the World Health Organization.²⁸ Canada has participated in this international survey since 1989 while the US became involved in 1998. The current analyses include national HBSC surveys in the US and Canada conducted in 2001/02.

Study Population and Procedures

Anonymous school-based surveys were conducted during the 2001/02 academic year according to the common HBSC research protocol.²⁸ National estimates were developed for 11 to 15 year old children in both countries. In Canada, classes within schools were selected using weighted probability techniques to ensure that students from different geographic areas, religious affiliations and languages of instruction were equally likely to be sampled. Analogous sampling procedures were followed in the United States, although children from designated minority groups (African American, Latin American) were over-sampled to provide more accurate population estimates of these groups. Statistical criteria specify that the national samples were sufficient to provide confidence intervals of $\pm 3\%$ for representative estimates with sample design effects no more than 1.4 times greater than would be obtained from a simple random sample.

Primary Measures

Variables used in this study were obtained from the self-report questionnaire consisting of 122 core questions as well as optional school setting items that were available in both countries. Individual items and factor analytically derived scales were used to describe and model relationships between physical aggression and perceived social environments.

Physical Aggression—Participants were asked to report two measures of physical aggression: 1) the frequency of engagement in physical fighting in the previous 12 months;¹² and 2) the frequency of engagement in physical bullying of another student(s) in the previous couple of months.²⁹ The physical fighting measure was originally developed for the Youth Risk Behavior Survey which reported a high test-retest reliability for this item (Kappa: 68.2%).¹³ The physical bullying measures were originally conceived by Olweus, who also reported high internal consistency reliabilities at the classroom level (0.80 to 0.90) during developmental analyses.²⁹ A composite measure of *physical aggression*, defined as engagement in at least two episodes of physical fighting in the previous 12 months and/or reporting the perpetration of at least 2 to 3 episodes per month of physical bullying, comprised the primary outcome.

Perceived Social Environment—Both factor analytically derived scales and individual items were used as measures of perceived social environment. These were examined as individual risk factors and later combined into a summary environmental risk score.

Measures involving scales: HBSC contains a series of items describing perceptions about home, peer groups and school.^{28,30,31} These were rated by students using five-point Likert-type scales, with response options of (1) *strongly agree* through (5) *strongly disagree*. Specific questions assessed student opinions surrounding parental support, perceptions of safety at school, peer group cohesion at school, fairness of school rules, and school atmosphere. To derive scales from these items, maximum likelihood factor analyses were initially run with oblique rotations using SPSS (version 12.0 for Windows). Model fit was determined using the Scree plot, the interpretability of the pattern matrix, and the value of the root mean square error of approximation (RMSEA). Following the exploratory factor analyses, confirmatory factor analyses with the maximum likelihood method of estimation were run in LISREL (version 8.0). Two scales were constructed: 1) parental support; and 2) peer support at school. Participant scores for these scales were categorized into three levels (high, medium, low levels of support) based upon the mean values of included items. Test-retest reliability of the items that contributed to these scales is reported to be high.^{28,31} Post-hoc reliability analyses based on the current data yielded a Cronbach's alpha >0.50.

Measures involving individual items: School environment was assessed by the item *how do you feel about school at present?* Test-retest reliability of this item is high.^{28,31} Available responses were combined into three categories: 1) high- *I like it a lot or a bit*; 2) medium - *I don't like it very much*; 3) low- *I don't like it at all*. Socio-economic status was assessed using responses to an existing perceived family wealth item: *how well off do you think your family is?*²⁸ Past analyses of this item suggest that it is well understood by school children and also correlates strongly with indicators of health and wellbeing, although formal reliability statistics are not available.³² Responses were combined into 3 categories: 1) high- *very or quite well off*; 2) medium – *average*; 3) low – *not very or not at all well off*.

Social Environment Risk Score—Based upon *a priori* theory,³³ we combined the four measures of social environment (parental support, peer support, school environment, socio-economic status) into an additive social environment risk score. For each measure contributing to the summary score, values were assigned to each category as follows: 0 for *high*, 1 for *medium*, and 2 for *low*. With four contributing variables, the range of possible values for the summary score was 0 through 8, where 0 represented the highest possible level of support and 8 the lowest possible level.

Analyses

The two national samples were described demographically. Descriptive analyses were used to estimate the prevalence of student physical aggression stratified by country, grade level (6 to 8; 9 to 10), sex, and the four individual measures of perceived social environment (socio-economic status, parental support, peer support, school environment). Logistic models were then used to estimate the relative odds of physical aggression for the four individual measures of perceived social environment. All models were developed within strata defined by country, grade level and sex. We then applied the environmental risk score to examine the cumulative additive effects of the four social contexts on the relative odds of physical aggression. Ethnicity was forced into each model as a potential confounder based upon *a priori* assumptions. To account for the sample design and clustering at the classroom level, the regression estimates reflect error inflation by a design effect of 1.4. All analyses were performed in SPSS (version 12.0, Chicago, IL, USA).

Approval to conduct the survey and related research was obtained from the ethics review boards associated with Queen's University and the National Institute of Child Health and Human Development. The international HBSC protocol was approved by the World Health Organization Europe.

RESULTS

Samples

Participants in the 2001/02 HBSC survey included students from 169 schools (Canada) and 340 schools (United States). In Canada, 74.2% of the students selected for the study completed the questionnaire, and their demographic profile was representative of Canadians in the same age range.³⁴ In the United States, 82.0% of those selected completed the questionnaire; while the primary sample is representative of a cross-section of US school children there is an over-sampling of minority students. Complete responses to items about aggression were obtained from 14049 (94.8%) students in the United States and 7058 (97.5%) students in Canada; the demographic profiles of these respondents are provided in Table 1. Because of missing responses on select items, 6613 (91.4%) Canadian and 12955 (87.4%) American records contained complete data on key exposures, outcomes and covariates and were included in the final regression models.

Physical Aggression and Social Environment

Prevalence of engagement in physical aggression varied by grade level and sex in both countries, with highest rates reported in boys vs. girls, and young vs. older children (Table 2). Higher rates of physical aggression were associated with lower perceived environmental support in a dose-related fashion. This relationship was found for each of the four social environment measures, socioeconomic status, parental support, peer support, and school environment, and was observed for every demographic group except for a curvilinear relationship between aggression and parental support in Canadian boys in grades 9 to 10. The strength and consistency of the observed relationship was further illustrated in logistic regression analyses (Table 3). The relative odds of aggression rose significantly in association with lower perceived levels of socioeconomic status, parental support, peer support, and school environment; with the single exception noted above, the pattern of risk gradients remained consistent across age and gender. The observed risk gradients were strong in all demographic groups, but especially pronounced among Canadian girls in grades 6–8.

There was also strong evidence for an increase in the relative odds of physical aggression observed in association with the additive environmental risk score. As the quality of the social environment declined (as indicated by a higher score) the relative odds of aggression generally increased. Again, these gradients were found within each of the four demographic groups under study in both countries (Figure 1).

DISCUSSION

Consistent with some studies,^{1,23} evidence on adolescent neurological development,³⁵ and theories predicting improved coping with social conflict as cognitive and interpersonal skills develop,^{36,37} physical aggression in the United States and Canada decreased with age from grades 6 through 10 and was higher in boys than girls. The literature, however, is inconsistent^{12,23} and other some theories of problem behavior predict increases in problem behavior during this period.³⁸

A major finding of this cross-national study was that student populations in the United States and Canada had remarkably similar rates of physical aggression. Our inability to distinguish

between minor from more major incidents of aggression likely contributed to the lack of observed cross-national differences. However, the consistency of this finding is striking in that no differences were observed across demographic strata. The reported North American rates also appear high when compared with rates for the average European adolescent.³⁹ Negative social environments were associated with higher relative odds of physical aggression in both countries. In addition, each of the four dimensions of the lack of social environment (lower socio-economic status, lower support from parents, lower support from peers, and lower satisfaction with school environments) appeared to be independently associated with higher odds of physical aggression. That is, all four measures of lack of environmental support contributed independently to an index of risk of physical aggression; increases in the relative odds of physical aggression were observed in association with the environmental risk score. The observed risk gradients were strong in all groups examined, and point to the presence of health disparities in both males and females. The observed differences in experiences with physical aggression by the environmental risk score were especially notable among Canadian females.

A major strength of the HBSC is that it permits cross-country comparisons of student health and behavior based upon standard measures and methods. Both national surveys were large, response rates were high, and the vast majority of students who engaged in the survey completed the items of interest. Measures used to define key variables used in this analysis have been tested and used extensively in United States and international analyses, which minimizes the potential for misclassification. These facts speak to the internal validity of the observed analytic findings.

Limitations of the HBSC and these particular analyses warrant recognition. First, although the approach to modeling used here may imply a temporal sequence, similar to other adolescent health surveys,¹² HBSC is cross-sectional and any observed associations require confirmation in longitudinal analyses. Standard criteria used in the assessment of causation include consideration of the strength of associations, statistical significance, biological or social plausibility, consistency, dose-response, as well as temporality.⁴⁰ Our analyses support all but the latter criterion. Second, findings from this study can only be generalized to populations of students who are able to participate in a school-based health survey. This may exclude portions of the student population that experience differential risks for physical aggression, including adolescents who are truant, cognitively impaired, or incarcerated. Any selection bias due to the non-participation of these groups is likely to attenuate observed estimates of effect. Third, the etiology of physical aggression is complex, and these analyses consider four of many possible determinants. There is an ongoing need for more complex models and methods of study that tease out the relative impacts of a complex array of contributing factors. Our environmental risk score represents a possible over-simplification of this social model in that each environmental risk factor is weighted equally. Finally, surveys such as the HBSC have the inherent limitation of being reliant on self-reports from children who actually attend school. Such assessments may not provide an optimal basis for explaining similarities and differences in violence between the full population of adolescents from different countries and/or cultures.

Physical aggression among students is clearly a negative health behavior that should be discouraged. Yet, our results suggest that physical aggression is relatively normative in North American adolescent populations, with substantial minorities of boys and girls in both the United States and Canada reporting aggressive behavior. Speculatively, physical aggression during adolescence could influence future development. Occasional fighting may encourage most youth to figure out how to avoid violent behavior through the consequences of their actions,³⁸ particularly for those with reasonably involved parents, teachers and other adult role models who discourage this behavior and help the adolescent to resolve the issue and avoid future confrontations.²⁵ However, persistent aggressive behavior is associated with a

trajectory of increased aggression and problem behavior, particularly in the absence of a positive and supportive social environment.^{25,38,41}

The finding that social factors were consistently associated with fighting in multiple age groups and sexes and in both countries is consistent with Problem Behavior Theory which posits that antisocial and problem behavior is the product of multiple social influences in homes, schools and neighborhoods that may interact with personal characteristics to create negative health outcomes.³³ From an adolescent development perspective, anti-social behaviors, including aggression, rapidly becomes normative during adolescence because of what Moffitt describes as the maturity gap, where adolescents are biologically mature, but socially immature, lacking meaningful adult social roles and responsibilities.³⁸ For most, however, continued aggression would not be reinforcing, particularly among those with pro-social contacts and who gain access to meaningful, more adult-like status and responsibilities. The positive dimension of these social influences may serve as protective factors that discourage physical aggression or increase personal resilience against negative environmental influences.²⁵ Consideration of the additive effects of different social factors on risks for physical aggression via the environmental risk score was also inspired by these theoretical perspectives and previous studies of adolescent behavior.²⁶ In past analyses, we have applied a similar method to study the health effects of multiple risk behavior.^{26,42} This approach to exposure assessment is simple, has a solid theoretical basis, and appears to be a useful tool to foster understanding of clustered risk factors and their consequences. With refinement, the risk score may provide a screening mechanism for the early identification of youth at high risk for violence and other negative health outcomes.

One aim of the current analysis was to develop evidence to think about differences in serious violence (e.g. violent crime) observed in Canada and the United States.²⁴ In this respect, our analysis is most unhelpful. It is curious that the prevalence of physical aggression and its association with socio-environmental factors are so similar among adolescents in the two countries, and yet violent crime and incarceration of juveniles and adults are so much greater in the United States.²⁴ One explanation may be the possible insensitivity of our measures and study design. Physical aggression is one component of a syndrome of problem behaviors,^{26, 33} and measures of aggression considered in isolation may not be the best indicator of a violent lifestyle. Second, we were unable to distinguish minor physical fights from more intense episodes of violence, and transient episodes from life-long patterns of anti-social behavior, which might partially mask national differences. Third, events involving physical aggression or the aftermath of these events may contribute to negative outcomes associated with social sanctions, especially in school environments where policies may be fairly standardized. This situation too may distort the findings of this cross-sectional analysis. Fourth, there are numerous contextual factors, e.g., characteristics of the youth's neighborhood, school, and family, that are not considered in these analyses yet have been shown to have significant influence on violence and aggression.¹⁶ Fifth, these additional contextual factors and those influences included in the model may have a different mediating and moderating effects across different economic, racial/ethnic, and rural/urban strata. Finally, it may well be that in the United States compared to Canada approaches to the control of physical aggression are more lax, unconstructive, or punitive, social norms regarding violence vary, or the relatively greater access in the United States to weapons of violence account for the observed differences in criminal violence.⁴³

This research provides additional evidence of the importance of the social environments as factors in adolescent aggressive behavior. The similarity of influences across countries suggest that these social environmental factors and the mechanisms by which they influence aggression are robust. It does not appear that children in the US have a propensity to engage in more physical aggression than their neighbors to the north. In both countries, family, peer, and school

social environments clearly serve as risk or protective factors, with significant cumulative impact on physical aggression in school and other environments.

Finally, the study findings have implications for school personnel. First, these findings provide new data about the magnitude and distribution of the physical aggression problem in Canada and the United States. Violence in schools has become a universal concern for teachers and administrators, and this large cross-national profile can contribute to the formulation and justification of contemporary educational policy in both countries. Second, the environmental risk score developed for our analysis has potential as a screening tool and when combined with measures of prevalence could provide schools with information about risk at the school level. School violence prevention programs might benefit from the use of an assessment of environmental risk. Finally, given what is understood about the long-term effects of this behavior on rates of adult aggression, and the more proximal negative effects on relationships with peers and attitudes towards school, school personnel are advised to implement policies to reduce aggressive behavior at school as a priority.

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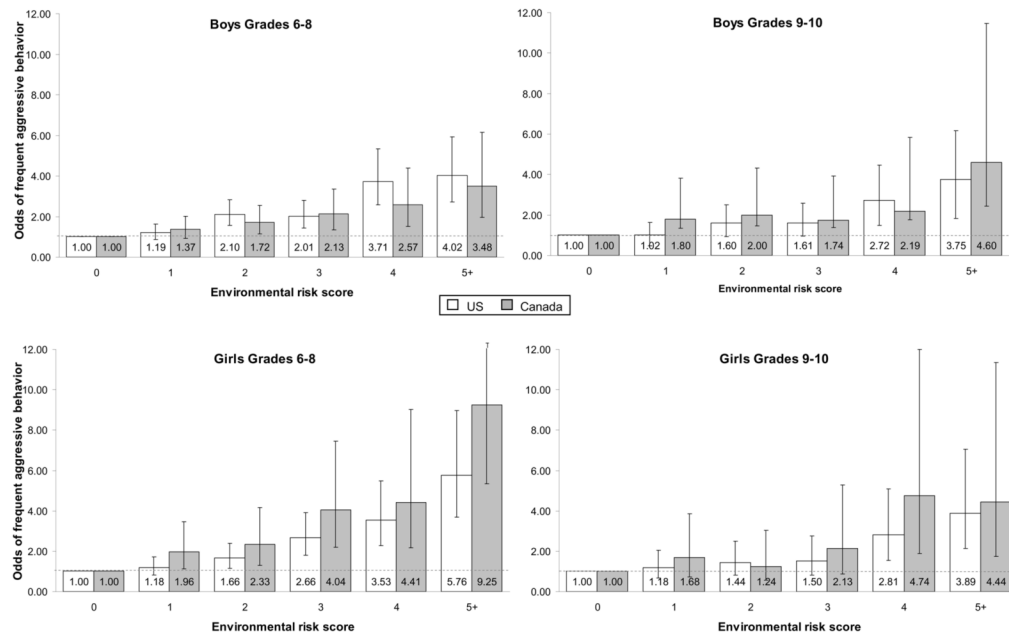


Figure 1. Relative odds of reporting physical aggression among adolescents in the United States and Canada by grade level, sex, and environmental risk score. Odds ratios adjusted for race/ethnicity. Error bars represent 95% confidence intervals.

Table 1

Demographic profile of national samples of adolescents in the 2002 HBSC Surveys

	UNITED STATES		CANADA	
	n=14049		n=7058	
	BOYS n=6645	GIRLS n=7404	BOYS n=3247	GIRLS n=3811
Grades 6–8 - n (%)	4244 (63.9)	4711 (63.6)	2233 (68.8)	2477 (65.0)
Grades 9–10 - n (%)	2401 (36.1)	2693 (36.4)	1014 (31.2)	1334 (35.0)
Mean age in years (SD)	13.8 (1.5)	13.7 (1.5)	13.7 (1.5)	13.7 (1.5)
Ethnicity - n (%)				
White	3448 (51.9)	3730 (50.4)	2769 (85.3)	3295 (86.5)
African American/Black	1208 (18.2)	1569 (21.2)	57 (1.8)	51 (1.3)
Hispanic/Latin American	1273 (19.2)	1429 (19.3)	12 (0.4)	24 (0.6)
Asian	297 (4.5)	301 (4.1)	199 (6.1)	245 (6.4)
Native/Aboriginal	272 (4.1)	262 (3.5)	81 (2.1)	71 (1.9)
Other/Unknown	147 (2.2)	113 (1.5)	106 (3.2)	116 (3.0)

Table 2

Prevalence of reported aggressive behavior among adolescents in the United States and Canada by grade level, sex, and perceived social environment

Measure of Social Environment	Proportion reporting aggressive behavior in previous 12 months							
	U.S.A.		Canada		U.S.A.		Canada	
	Boys grades 6–8				Boys grades 9–10			
Total n, %	4244 *	32.8	2233 *	29.9	2401 *	29.8	1014 *	24.5
SES								
High	2453	31.0	1292	29.1	1304	27.8	535	21.9
Medium	1166	35.8	603	34.3	803	31.6	375	25.9
Low	335	43.0	212	34.4	190	39.5	89	32.6
Parental support								
High	2962	28.9	1736	29.4	1546	26.8	693	24.5
Medium	814	38.5	385	34.8	487	30.4	238	19.7
Low	373	49.9	88	46.6	320	42.2	72	36.1
Peer support								
High	2207	27.8	1315	27.8	1078	25.2	544	21.0
Medium	1290	34.1	679	31.8	871	29.6	372	25.8
Low	584	46.9	207	48.3	381	42.5	87	37.9
School environment								
High	2823	27.3	1428	26.4	1441	24.5	605	19.5
Medium	856	40.8	507	35.3	553	30.0	261	28.7
Low	519	49.1	272	47.4	381	49.1	141	36.9
Girls grades 6–8								
Total n, %	4711 *	17.0	2477 *	12.8	2693 *	14.6	1334 *	10.9
SES								
High	2632	14.0	1310	10.5	1268	12.5	685	9.6
Medium	1399	19.4	788	16.0	1119	15.5	546	11.4
Low	442	29.4	207	19.8	237	22.4	87	18.4

Measure of Social Environment	Proportion reporting aggressive behavior in previous 12 months								
	U.S.A.		Canada		U.S.A.		Canada		
	Boys grades 6–8				Boys grades 9–10				
Parental support	High	3482	14.5	1943	10.4	1815	12.8	922	8.9
	Medium	821	19.1	405	18.3	560	15.2	295	12.9
	Low	345	34.8	106	35.8	299	22.7	114	21.9
Peer support	High	2730	14.0	1580	10.5	1362	11.5	792	9.1
	Medium	1401	17.1	696	15.2	1008	15.8	432	12.0
	Low	467	31.5	183	23.5	298	23.5	106	17.9
School environment	High	3563	13.8	1867	10.1	1841	11.7	920	8.5
	Medium	783	23.5	439	18.2	598	17.9	283	11.3
	Low	328	36.3	146	29.5	234	28.6	123	28.5

* total response for aggressive behavior; small variation in number of missing for different social environments

Table 3
Relative odds of aggressive behavior among adolescents in the United States and Canada by perceived social environment

Measure of social environment	Odds of reporting aggressive behavior in previous 12 months							
	U.S.A.			Canada			U.S.A.	
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
	Boys grades 6–8				Boys grades 9–10			
SES								
High	1.00		1.00		1.00		1.00	
Medium	1.24	(1.01–1.52)	1.27	(0.95–1.71)	1.20	(0.92–1.57)	1.25	(0.81–1.92)
Low	1.68	(1.21–2.32)	1.28	(0.86–1.98)	1.70	(1.09–2.64)	1.73	(0.90–3.42)
Parental support								
High	1.00		1.00		1.00		1.00	
Medium	1.54	(1.23–1.93)	1.28	(0.96–1.78)	1.19	(0.87–1.63)	0.76	(0.46–1.26)*
Low	2.45	(1.80–3.32)	2.10	(1.15–3.84)	2.00	(1.41–2.83)	1.74	(0.85–3.55)*
Peer support								
High	1.00		1.00		1.00		1.00	
Medium	1.34	(1.09–1.65)	1.21	(0.92–1.61)	1.25	(0.94–1.65)	1.31	(0.85–2.02)
Low	2.29	(1.76–2.98)	2.43	(1.60–3.69)	2.19	(1.55–3.08)	2.31	(1.18–4.51)
School environment								
High	1.00		1.00		1.00		1.00	
Medium	1.84	(1.47–2.29)	1.52	(1.12–2.06)	1.32	(0.97–1.79)	1.66	(1.04–2.66)
Low	2.58	(1.97–3.36)	2.52	(1.73–3.65)	2.97	(2.14–4.12)	2.41	(1.38–4.20)
	Girls grades 6–8				Girls grades 9–10			
SES								
High	1.00		1.00		1.00		1.00	
Medium	1.49	(1.17–1.89)	1.63	(1.13–2.35)	1.29	(0.94–1.79)	1.20	(0.72–2.01)
Low	2.56	(1.85–3.55)	2.12	(1.23–3.62)	2.02	(1.24–3.29)	2.11	(0.93–4.88)
Parental support								
High	1.00		1.00		1.00		1.00	
Medium	1.39	(1.06–1.84)	1.92	(1.28–2.88)	1.22	(0.83–1.80)	1.51	(0.86–2.69)
Low	3.14	(2.24–4.40)	4.79	(2.65–8.66)	2.00	(1.31–3.06)	2.88	(1.43–5.78)

Measure of social environment	Odds of reporting aggressive behavior in previous 12 months							
	U.S.A.				Canada			
	OR	95% CI	OR	95% CI	OR	95% CI	OR	95% CI
Peer support	1.00		1.00		1.00		1.00	
	1.27	(0.99–1.63)	1.53	(1.06–2.20)	1.45	(1.04–2.02)	1.37	(0.81–2.32)
	2.82	(2.07–3.86)	2.62	(1.54–4.44)	2.37	(1.53–3.69)	2.18	(1.01–4.73)
School environment	1.00		1.00		1.00		1.00	
	1.92	(1.47–2.51)	1.98	(1.33–2.95)	1.65	(1.16–2.35)	1.38	(0.76–2.53)
	3.56	(2.53–5.01)	3.71	(2.16–6.37)	3.03	(1.95–4.73)	4.29	(2.27–8.12)

* p for trend =0.44; all others p<0.05